

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended) :

1. A system for supplying ~~extra low voltage electrical energy for~~ at least one electrical traction vehicle (30) running on a track (20) and comprising:

- wheels (31) linked to said vehicle and rolling on said track (20), and

- at least one traction chain (70) of said vehicle acting on the wheels (31) ~~and comprising, in a manner known per se,~~ at least one electric motor **(71)** and its control **(72)**,

- at least one ~~extra low voltage~~ power supply means (10) installed in the ~~immediate~~ vicinity of the track (20),

~~two power supply rails (41, 42) or similar power supply elements, parallel to each other, adjacent or distant, of which a first (41) is linked to a terminal (11) of said power supply means (10) and the second (42) is linked to another terminal (12) of said power supply means (10),~~

- at least one ~~first~~ electrical energy collection means (51, **52**) on board the vehicle ~~and placed in moving contact with said first rail (41),~~

~~at least one second electrical energy collection means (52) also on board the vehicle and placed in moving contact with the said second rail (42),~~

- at least one electrical energy storage means (60) on board the vehicle,
System characterized in that ~~it comprises at least one onboard power supply means (80) which is linked to said electrical energy collection means (51, 52), and which is connected on the one hand to said~~ the storage means (60) comprises at least supercapacitors (61) and on the other hand to said traction chain (70), and which controls controlled by at least one onboard energy management computer (85) the energy distribution from the storage means (60) to the traction chain (70) and in particular the recharging of the storage means (60) and its selective discharging to feed the traction chain (70) according to the energy demand and the rolling sequences of the vehicle

and in that

1°) the on board energy management computer (85) controls the energy storage of the super capacitors (61) :

- during phase 2 and phase 4 with energy from the external source (10) because the electric traction motor (71) did not need energy at this time;
- during phase 3 with energy from the external source (10) and with energy braking because the electric traction motor (71) generates energy at this time;

2°) the on board energy management computer (85) controls the discharges the super capacitors (61) during phase 1 with energy stored while phase 2, 3 and 4 as is or in addition to the external power source (10) in order to supply the electric traction motor (71) with the required energy at this time.

Claim 2 (new) :

2. The system as claimed in claim 1, is characterized in that the external supply means (10) electric power needed to power a vehicle is between 25% and 75% of the peak electric power of the said traction motor (71).

Claim 3 (new) :

3. The system as claimed in claim 1 or 2, characterized in that the storage mean comprises electric battery (62),
and in that if the external power supply (10) fails:
1° the on board energy management computer (85) controls the energy storage of the super capacitors (61) :
- during phase 2 and phase 4 with energy from the battery (62) because the electric traction motor did not need energy at this time;
- during phase 3 with energy from the battery (62) and with energy braking because the electric traction motor (71) generate energy at this time;

2° the on board energy management computer (85) controls the discharges the super capacitors (61) during phase 1 with energy stored while phase 2, 3 and 4 as is or in addition to the battery (62) in order to supply the electric traction motor (71) with the required energy at this time.

Claim 4 (currently amended) :

4. The system as claimed in either of the preceding claims, characterized in that the voltage delivered by the power supply means (10) is an extra low voltage power

supply ~~48 volts DC, one of the power supply rails (41)~~
~~being at +24V and the other (42) at -24V.~~

Claim 5 (new) :

5. **The system as claimed in any one of the preceding claims, characterized in that the voltage delivered by the power supply means (10) is 48V or 60V.**

Claim 6 (original) :

6. The system as claimed in one of the preceding claims, characterized in that the onboard power supply means (80) comprises at least one computer device (85) controlling the energy distribution from the storage means (60) to the traction chain (70), and in particular the recharging of the hypercapacitors (61), their selective discharging to feed the traction chain (70) according to the energy demand, the rolling sequences and the line losses, and the recovery of braking energy from the vehicle by the storage means (60) from the motor of the traction chain (70) switched to generator mode.

Claim 7 (original) :

7. The system as claimed in claim 6, characterized in that the onboard power supply means (80) comprises:

- a first DC/DC electrical voltage converter (81) for raising the 48V DC extra low voltage of 400V DC, on a common supply bus (82);

- a second DC/DC reversible electrical voltage converter (84) suited to the supercapacitors (61) working in the 400V to 800V range and delivering the power supply from the supercapacitors (61) to the bus (82) and

recharging it from the bus (82) depending on the operating phases;

- a main energy management computer (85) managing the running, speed, braking and stopping operation of the vehicle (30), the main computer (85) being linked to secondary computers, respectively, a computer for the supercapacitors (61), a computer for the batteries (62), a computer for the traction chain (70), a computer for the pick-up device (51, 52, 53), these computers being more specifically assigned to the dedicated management of the elements to which they are linked;

- a safety discharging device for switching the on board power supply means to a safe mode for maintenance operations, and,

- a battery charger device directly fed by the pick-up device (51, 52, 53) and selectively recharging the batteries (62) according to the control from the batteries computer.

Claim 8 (original) :

8. The system as claimed in claim 7, characterized in that the main computer (85) determines, by periodic measurement, the position x of the vehicle (30) to compute the distance between the vehicle (30) and the nearest power supply means (10) and, based on this information, the computer (85) controls the first converter (81) to optimize the current pick-up, for example, by reducing its intensity if it is remote from the extra low voltage supply means (10) and by increasing it when the vehicle approaches a next extra low voltage supply means so as to limit the line losses by Joule effect.

Claim 9 (original) :

9. The system as claimed in any one of the preceding claims, characterized in that said vehicle (30) is a rail vehicle running on a rail track (20), the rolling rails of which (21, 22) can be combined, at least one, with the power supply rails (41, 42), or are separate from the latter.

Claim 10 (original) :

10. The system as claimed in any one of the claims 1 to 8, characterized in that said vehicle is a vehicle with pneumatic tires (30', 30'').

Claim 11 (original) :

11. The system as claimed in claim 10, characterized in that said electrical energy collection means (51', 52'; 51'', 52'') are disposed under the vehicle (30', 30'') being transversely mobile to accompany the vehicle (30', 30'') on the track (20', 20''), and can be retracted over an obstacle or out of the power supply rails (41', 42'; 41'', 42'').

Claim 12 (original) :

12. The system as claimed in claim 10, characterized in that the track (20', 20'') comprises a vehicle guide rail (30', 30'').